W. G. TRAUTMAN.

SUCTION CLEANING APPARATUS.

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1,293,250.

Patented Feb. 4, 1919.

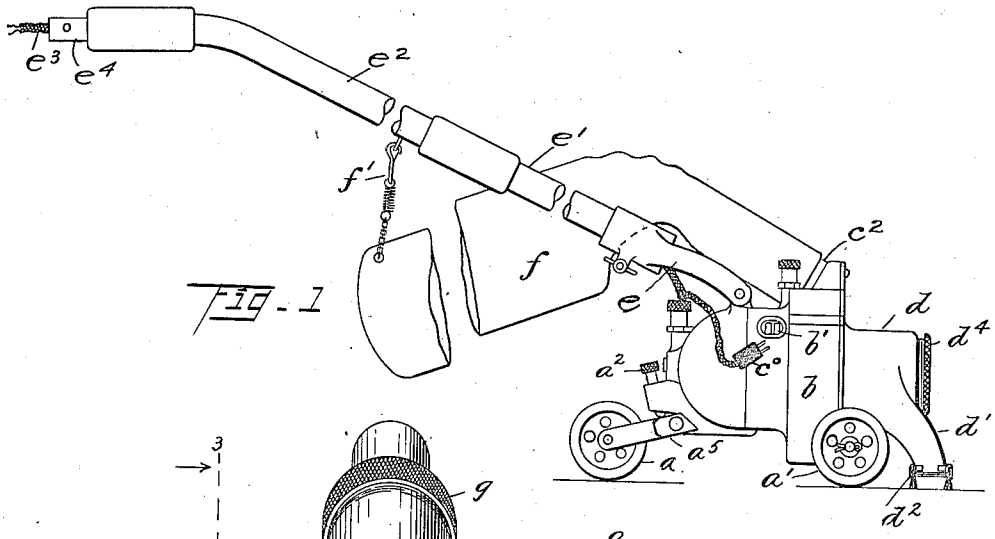


Fig. 1

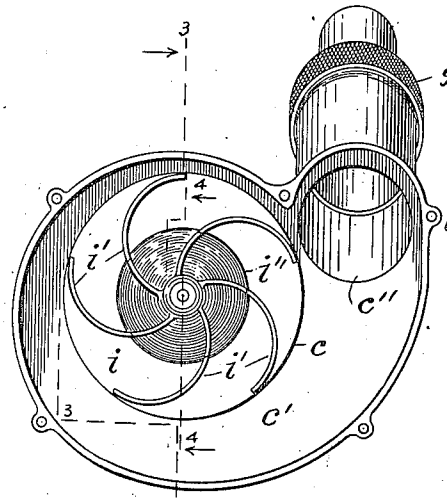


Fig. 2

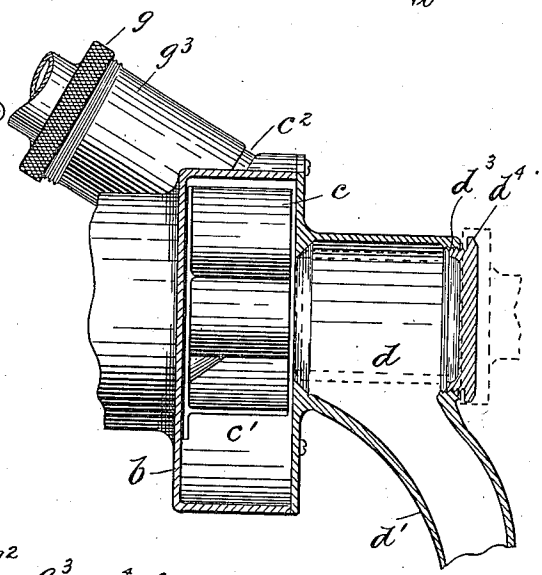


Fig. 3

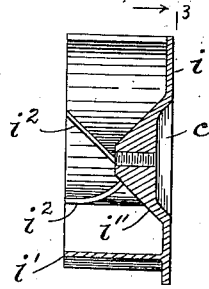


Fig. 4

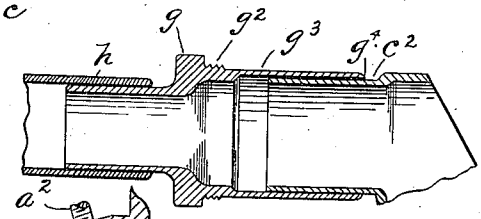


Fig. 5

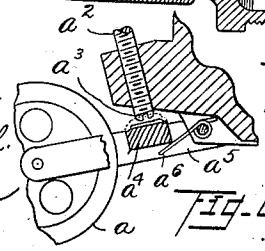


Fig. 6

Witnesses:
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UNITED STATES PATENT OFFICE.

WALTER G. TRAUTMAN, OF CLEVELAND, OHIO, ASSIGNOR TO THE P. A. GEIER COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

SUCTION CLEANING APPARATUS.

1,293,250. Specification of Letters Patent. Patented Feb. 4, 1919.

Application filed June 10, 1912. Serial No. 702,915.

To all whom it may concern:

Be it known that I, WALTER G. TRAUTMAN, a subject of the Emperor of Germany, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Suction Cleaning Apparatus, of which the following is a specification.

My invention relates to improvements in suction cleaning apparatus, and has for its object the increase of efficiency and adaptability of apparatus of this class.

More particularly, my improvements relate to a rotary fan especially designed for this particular use; means for converting a portable vacuum cleaning device, so that it may be used with a hose either for blowing or vacuum cleaning. For this purpose, tubular telescoping handle-members are provided which may also be used with a manually-actuated nozzle and through which conducting cords normally run to the portable machine, connecting with a removable switch at the end of the handle. An adjustment acting through a pivoted supporting wheel, serves to elevate and depress the nozzle of the portable cleaner; said wheel being normally actuated against a terminally slotted adjusting screw by means of a spring.

These features, together with other details of construction and the mode of operation, may be fully explained in connection with the accompanying drawings, wherein:

Figure 1 is a view in side elevation, partially broken away, illustrating a portable vacuum cleaning device equipped with my improvements;

Fig. 2 is a transverse sectional view through the fan-chamber;

Fig. 3 is a longitudinal sectional view, partially broken away, on line 3—3, Fig. 2;

Fig. 4 is a vertical section through the fan on line 4—4, Fig. 2;

Fig. 5 is a longitudinal sectional view through the convertible member attached to the blower orifice of the fan, and

Fig. 6 is a fragmentary sectional view, partially broken away, showing the adjusting mechanism.

Throughout the several figures of the drawings, I have employed the same character of reference to indicate similar parts.

Fig. 1 may first be referred to, because of its illustration of the assembled improvements. The portable vacuum cleaner shown therein, is mounted upon three wheels a a'; the rear wheel of which is made adjustable. The rearward section of the casing b contains the usual electric motor connected with the fan c rotating within its casing or fan-chamber c'. The forward portion d of said casing, terminates in the vacuum cleaning nozzle d' shown with a removable brush-attachment d^2 positioned thereon, while the opening d^3 registering with the rotary fan, is closed by the screw-cap d^4.

A pivoted fork e receives the lowermost of the tubular telescopic handle-members e' e^2, through which the conducting cords e^3 are normally led to connect with the contacts b' upon the motor casing. A removable switch e^4 is inserted within the end of the handle-member, thus enabling the switch and cord to be withdrawn when the handle-members are removed from the portable vacuum cleaner, either for packing or use as extension tubes, in connection with a hose and attachable nozzle. The usual dust-collecting bag f secured at one end by a hook and chain f' to the handle-member e^2, is provided for connection with the orifice c^2 of the fan-chamber.

The convertible member g terminating a hose h of any desired length, is shown in position upon the thimble providing said orifice or discharge-nozzle c^2 for the fan-chamber. Said member g is threaded at g^2 and provided with a beveled annular lip g^4, so that it is adapted to be inserted before the fan-chamber and screwed into the threaded opening d^3 in the position shown by the dotted lines. Fig. 3. Thus, the hose connection may be equipped with any suitable form of nozzle or tool and used either for a blower attachment or suction cleaner. Accordingly, said member g, being adapted to fit tightly against its beveled seat within the fan-chamber and exteriorly of the discharge-nozzle, is convertible either for use as a suction or blower attachment.

The fan, as best shown in Figs. 2 and 4, comprises a disk i, mounting a central cone i'' and some five ellipsoidal vanes i'. These vanes are centrally cut away at an inclination with the axis of the fan to form diagonal edges i^2; the cut away portions representing a hollow cone of substantially the

size and shape of the solid cone i''. The fan is rotatably mounted upon the motor-shaft within the fan-chamber, so that a slight clearance, approximately ($\frac{1}{16}''$) one-sixteenth of an inch is provided between the forward wall of said chamber and the vanes. As shown in Figs. 2 and 3, the rotary fan is mounted eccentrically within the cylindrical fan-chamber c', thus affording wide clearance peripherally, and more particularly in the region of the outlet c'' to the discharge nozzle c^2.

The purpose of this particular construction is to afford means for disposing of the different classes of refuse, commonly sucked up by a vacuum cleaning device without clogging the fan. I have found that a fan of this construction affording a conical open space connecting directly with the inclines of the solid rear cone, is well adapted to divert the bulk of the solid particles without interfering with the action of the fan. The sharpened edges of the vanes, however, are adapted to tear or cut materials which tend to clog the fan, while the air-currents produced by the vanes, sweep the various particles of refuse from between the ellipsoidal vanes and through the orifice c'' into the bag f.

With the convertible member g and its hose connection h positioned over said orifice, the screw-cap d^4 preferably is removed to afford a direct circulation of air for the fan and blowing attachment. If, on the other hand, said convertible member g is screwed within the front opening d^3, the interior passage to the vacuum cleaning nozzle is closed by the sleeve-like extension g^3 of said member, and the suction will be effected through the connected hose and nozzle, for the purpose of cleaning hangings, side walls and the like.

In order to adjust the height of the nozzle d' and its brush-attachment, I provide the screw a^2 at the rear of the casing which is terminally-slotted at a^3, thereby adapting it to engage with and temporarily lock against a rib a^4, provided upon the pivoted frame a^5, mounting the rear wheel a. This frame is normally maintained in close engagement with the adjusting screw, by means of the spring a^6, whereby the inclinations of the frame may be suitably varied to raise or lower the forwardly positioned nozzle, and thereby adapt the same for efficient service with floor coverings of different thickness and texture. This adjustment is well indicated in Figs. 1 and 6; the screw a^2 in the latter figure being shown turned so as to exhibit its slotted end, while the dotted line designates the position of the edge of the rib a^4, when the screw is turned one-quarter around to accommodate said rib. The nozzle d' will be raised or lowered, partially rotating about the axis of the front wheels a', accordingly as the rear wheel a and its pivotal bracket are retracted or extended by the action of the screw.

From the foregoing, it will be seen that great adaptability and efficiency are secured for a vacuum cleaning appliance when equipped with my improvements, which I have above described in their preferred embodiment and desire to claim in their broader application, as follows:—

1. In apparatus of the class described, the combination with the fan-chamber of a vacuum cleaning device, of a rotary fan comprising a central cone-shaped body and a plurality of vanes converging thereto, eccentrically positioned within the fan chamber; said vanes being centrally cut away opposite said body substantially in the form of a similar cone, an associated vacuum-cleaning nozzle and means for rotating said fan, substantially as set forth.

2. In apparatus of the class described, the combination with a vacuum cleaning nozzle, of a communicating fan-chamber, a rotary fan therein, comprising a central cone-shaped body and a plurality of vanes of semi-ellipsoidal shape converging thereto; said vanes being centrally cut away opposite said body substantially in the form of a similar cone, and means for rotating said fan, substantially as set forth.

3. In apparatus of the class described, the combination with a portable vacuum cleaning device, including a fan-chamber open at the front thereof, its rotary fan and a discharge-nozzle for said fan-chamber, of a tubular converting member and its hose connection; said member being adapted to fit within said front opening or upon the discharge-nozzle, substantially as set forth.

4. The combination with a portable suction cleaning appliance having a forwardly positioned suction nozzle, of forward and rear wheels whereon said appliance travels, a pivoted bracket mounting the rear wheel, a spring tensioned against the bracket and an adjusting-screw acting upon said bracket to alter its angular relation with respect to the appliance, whereby the height of the nozzle may be adjusted, substantially as set forth.

5. In apparatus of the class described, the combination with a portable vacuum cleaning appliance, of a plurality of wheels for supporting the same, a pivoted frame mounting one of said wheels, an adjusting screw slotted at its bearing end, a rib engaging the slot, and a spring acting against the pivoted frame, substantially as set forth.

6. In apparatus of the class described, the combination with a vacuum cleaning appliance, of two forward wheels adjacent to the cleaning nozzle thereof, a pivoted frame rearwardly supporting said appliance, a wheel mounted therein, an adjusting screw

acting against the pivoted frame, and a spring normally maintaining the engagement of said frame with the adjusting screw, substantially as set forth.

7. In apparatus of the class described, the combination with a portable vacuum cleaning device including a fan-chamber, open at the front to the cleaning nozzle of the device, of a removable cap normally closing the exterior of said nozzle, adjacent to the fan-chamber, a discharge-nozzle, and a convertible-member adapted to replace the cap or fit the discharge nozzle, said member having a sleeve extending to the fan-chamber, and an extension for attaching a hose connection, substantially as set forth.

8. In apparatus of the class described, the combination with a portable vaccum cleaning device, including a fan-chamber having a beveled opening, a discharge nozzle therefor, and a forwardly positioned vacuum cleaning nozzle, of a beveled sleeve-like convertible member and hose-connection; said member being adapted to fit within the opening and close the passage to the cleaning nozzle, or fit upon the discharge nozzle, substantially as set forth.

9. A suction cleaning appliance of the class described, including a fan disk mounting semi-ellipsoidal vanes centrally cut away, a motor directly connected for driving the fan, and a fan chamber with inlet and outlet openings wherein said fan is eccentrically positioned opposite the inlet opening, affording a graduated peripheral clearance for the fan increasing in the direction of the outlet opening, substantially as set forth.

10. A suction cleaning appliance of the class described, including a fan formed of semi-ellipsoidal vanes, a motor directly connected for driving the fan, and a fan chamber with inlet and outlet openings wherein the fan is eccentrically positioned opposite the inlet opening, affording a graduated increasing peripheral clearance for the fan in the direction of the outlet opening and of the convexity of the vanes, substantially as set forth.

In testimony whereof I do now affix my signature in presence of two witnesses.

WALTER G. TRAUTMAN.

Witnesses:
P. A. GEIER,
ALBERT LYNN LAWRENCE.